Susan Kolibaba Oct.1, 2010 lab for life in the Universe

First class, Instructor outlined class objectives and class work assignments. She states that adult learners do well with a variety of approaches. She wants students to take notes in class, and then meet in small groups to write up notes together. The reason for this is that adults learn by hearing information, writing it down and then re-writing the material. This process helps with long term learning. She also stated that for exams the most effective way to study is to cram right before the exam. This works well for testing but the information is not then retain in long term memory. She wants to utilize both types of learning for this class.

She reviewed the syllabus and organization of classes, lecture on Monday Wednesday and lab on Friday. The class policies were reviewed from syllabus, group note taking, group presentations, exams, lab exercises, grading, attendance, course web site, email policy, academic integrity, accommodations, course goals and tentative course schedule.

Class web site is <http://web.pdx/~edu/~mhutson/345U/>

Discussed was the circumstance that instructor will be absent for weeks 6 and 7 to recover from surgery. Students will meet during that time to work on group presentations. Groups will be chose a Mars topic and will create a properly referenced PowerPoint presentation to be present in class week 8. See class syllabus.

There will be a midterm and final exam, closed book. There are specific standards for what is an acceptable excuse for missing the planned exam. There will be lab exercises done in class as a small group.

Instructor moved on to begin first lecture, outlining the course description and that this is a new field of science which began in 1996. She doesn’t have a text book as the currently published books are out of date or contain a great deal of math and are not suited to this level of course.

This field is called Astrobiology and touches on multiple disciplines. These include Chemistry, Biology, Geology, Astronomy, Engineering and Physics. Instruction reviewed an Astrobiology Primer that should the multiple fields that Astrobiology includes. See reference for Primer.

Scientists at the Johnson Space Center, in 1996, discovered evidence that there is compelling evidence to suggest that there is life on Mars. They studied a Martian meteorite. This may be the first extra solar planet. There is much controversy over this discovery in the scientific community. Most scientists do not agree with this assessment, some agree and some are waiting for more study to be done.

A key question was how small can an organism be and be alive? Instructor discussed that fossil bacteria is hard to recognize. Scientists had made assumptions that other solar systems would be organized as our system is. Instructor stated that are lots of ways life lives in extreme situations. Life must have liquid, can survive in a dormant state but must have liquid to live. In space dust Ecoli could survive but be dormant.

Question, are there other Earth like planets? Review of our solar system, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. “Dwarf” planets include Ceres, Pluto, and Eris.

We don’t have a good definition of “planet, we have “squishy” definition.

Solar system is all the material (planets, moons, comets, asteroids, etc) that is gravitationally bound to our star. Star is a gaseous sphere that produces enough heat in its interior by nuclear fusion to withstand the force of gravity. There are live, dead and not quite alive stars. The first definition of planet comes from the Greek, points of light, moving though constellations. Now planets are defined as large (but not too large), objects that orbit the sun. A planet orbits the sun; a moon can’t be a planet because it doesn’t orbit the sun. Definitions per discussion see lecture notes from class web site.

Looking at our solar system, can look from above or from the side, not all planets are in a perfect plane. Solar system has four inner terrestrial (Earth like) planets and four outer Jovian (Jupiter like) planets and these are separated byt an asteroid belt. Asteroid belt is not a busted up planet.

Pluto is smaller than Mercury and is titled on a 15 % plane. This is deferent from the plants’ plane. Way out in the solar system is comets and which are icy bodies.

References

Syllabus <http://web.pdx.edu/~mhutson/345U/syllabus.pdf>

Lecture notes from class web http://web.pdx.edu/~mhutson/345U/lectures/Lecture-1.pdf

Astrobiology Primer http://arxiv.org/ftp/astro-ph/papers/0610/0610926.pdf